

A NEW SPECIES OF THE SPIDER GENUS *HYGROPODA* (ARANEAE: PISAURIDAE) FROM INDIA

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ABSTRACT

A new species of the genus *Hygropoda* belonging to the family Pisauridae is being reported for the first time from Mahendri forest, Maharashtra, India. Both male and female of *Hygropoda* are illustrated from specimens collected from riparian ecosystem of Mahendri. The species described in this paper is new to Indian fauna.

Keywords: Pisauridae, *Hygropoda*, new record, Mahendri (India), Taxonomy

INTRODUCTION

In the winter of 2012, a team of Indian Society of Arachnology discovered an interesting female spider from family Pisauridae which was sitting on a longitudinally folded leaf. Males were seen overhanging with their flexible tarsi. Mature spiders of both sexes were collected.

Hygropoda is a wide spread genus, including 27 species, from Africa through south-east Asia, New Guinea to China (Platnick, 2013). Three species of the genus are known from India up to the present (Keswani *et al.*, 2012). *H. chandrakantii* (Reddy & Patel, 1993); *H. gracilis* (Thorell, 1891) and *H. sikkimus* (Tikader, 1970). Initially they were identified as *Tinus chandrakantii* and *Tinus sikkimus*, recently they are transferred to *Hygropoda* (Jäger, 2011).

MATERIALS AND METHODS

Spiders both males and females were collected by hand during September, 2012 from Mahendri Reserve Forest Maharashtra, India during night at about 11pm. Photographs of live specimens were taken with Fugi camera. The material was preserved in 70% alcohol with all legs and pedipalp spread properly by following a method as described earlier (Vankhede, 2012). External morphology was examined and photographed with CarlZeiss Stemi-4 stereozoom microscope equipped with image processing system. Measurements of leg segments were taken from the ventral side with digimicroscope. All measurements are in millimeters. Leg formula denotes the legs in the order of their length starting with the longest. Female genital

organs were dissected and cleared in 10% potassium hydroxide (KOH). Male pedipalp was cleared *in situ* with 1% KOH. Because of the similar body color pattern, stable number of cheliceral teeth, and similar leg spine distributional pattern at species level, the species descriptions are focused on the male and female genitalic structures.

The material examined is deposited in the Arachnology Museum of SGB Amravati University, Amravati, Maharashtra, India.

TAXONOMY

FAMILY -PISURIDAE , SIMON 1890

Genus – *Hygropoda* Thorell, 1894

Hygropoda Thorell, 1894: 4; Simon, 1898: 315; Pocock, 1900: 245; Roewer, 1955: 137; Bonnet, 1957: 2243; Hu, 1984: 260; Yaginuma, 1986: 176; Zhang *et al.*, 2004: 381; Dankittipakul *et al.*, 2008: 312; Platnick, 2013.

Type species. *Hygropoda mahendriensis* sp. nov.

Material examined.- 11 Females and 2 Males

Etymology.-The species is named after the original inhabitant of Mahendri Forest, therefore called “*mahendriensis*”

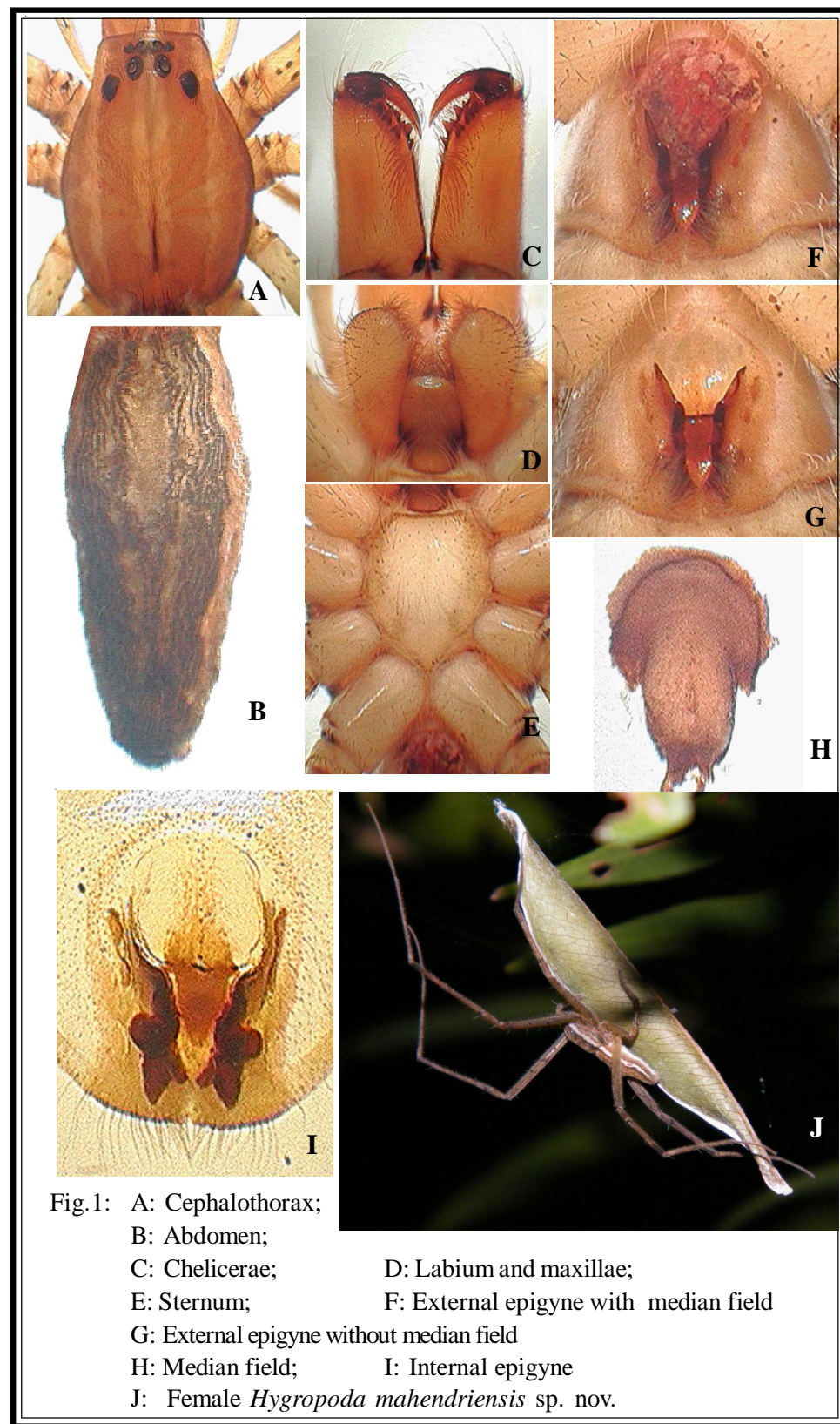
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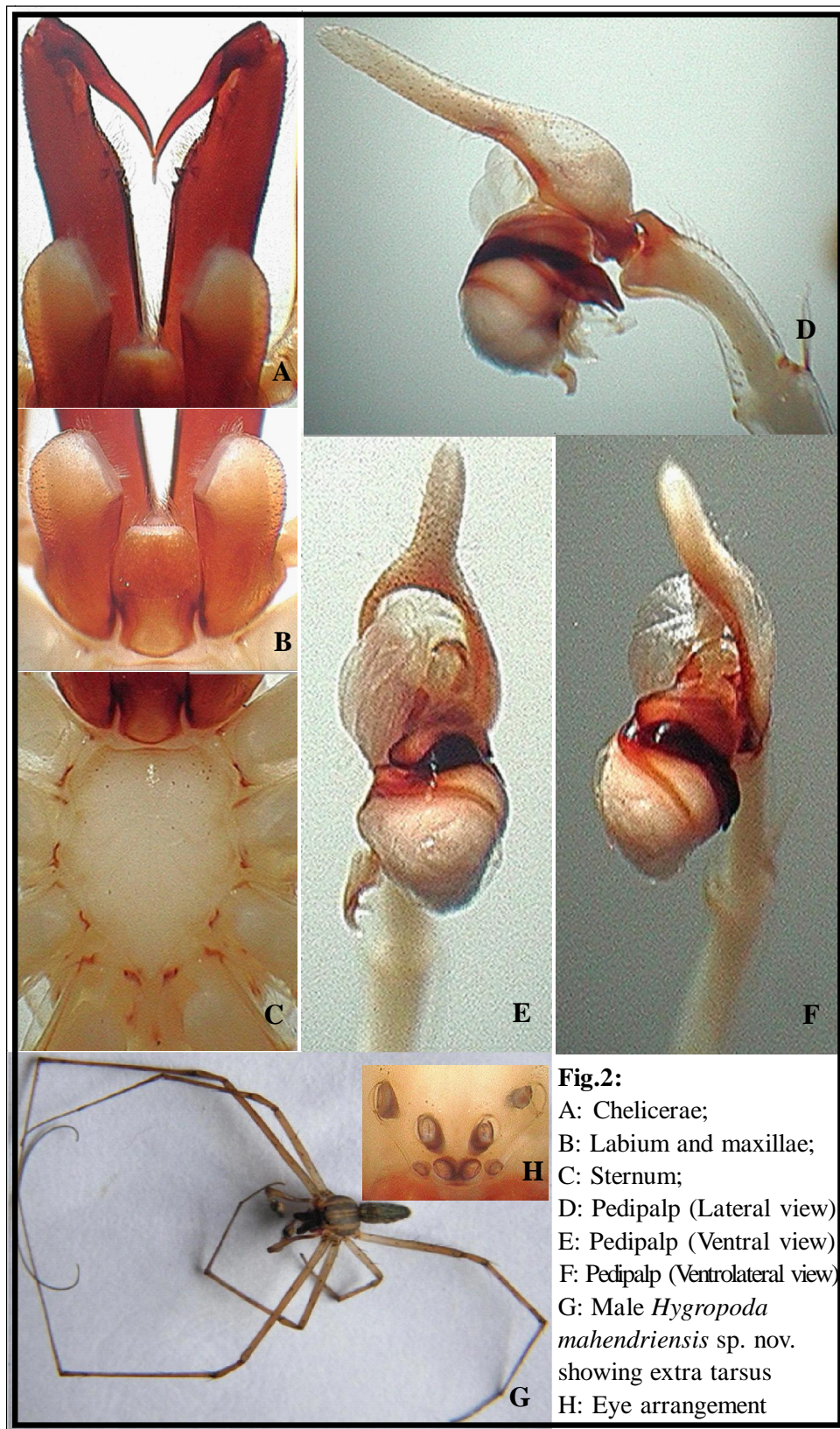
Hygropoda mahendriensis sp.nov. is a riparian spider which was collected from shrubs close to the edge of running stream located near Pandhari village close to Mahendri Reserve Forest. The females were seen on the sheet webs on the upper side of large leaves and some of the females were seen holding the folded leaf of the shrub. Later it was observed that the females had laid the eggs in the leaf (Fig. 1J). The males were overhanging from the branch of shrub stuck over the flowing stream with their flexible tarsi.

General Description: Female *H. mahendriensis* sp.nov.

Medium sized, dark coloured, cribellate spider with long, slender slightly prograde legs in resting condition. Carapace slightly longer than wide, marked with bands. Distinct vertical fovea, eyes distinctly black, arranged in 2 rows (anterior row nearly straight while posterior row highly recurved), abdomen, longer than wide, tapering posteriorly, decorated with cryptic, dark coloured folium, extending from anterior to posterior region. Both cephalothorax and abdomen shows a continuous white band laterally on either sides.

Carapace (Cephalothorax / Prosoma): Carapace longer than wide, brown coloured with variable vertically radiating bands. Carapace margins marked with a band of dark brown plumose setae laterally from both sides. Complete carapace densely furnished with white and brown, fine plumose setae, imparting color to





cephalothorax in the form of bands. Carapace nearly similar in length and width posteriorly and in middle region while slightly narrowed anteriorly. Carapace decorated with paired brown bands running vertically till the posterior region and covering the whole of the cephalothorax, while three white bands (2 laterally, 1 medially) running along the brown bands, demarking the bands separate from each other, cephalic and thoracic region distinctly separated by posteriorly converging cephalic groove, thoracic region comparatively longer than wide, decorated with fine brown radiating striations, which run from both sides of cephalic groove including fovea, approaching laterally, covering almost $\frac{1}{2}$ of thoracic region.

Eyes: Distinctly black with slightly recurved anterior row and highly recurved posterior row, covering almost $\frac{3}{4}$ of the cephalic region. Anterior row composed of comparatively small sized eyes, while eyes of posterior row are bigger size. All eyes placed on shallow tubercles, unequal in size with anterior laterals smaller, posterior eyes unequal with posterior laterals being the biggest of all eyes, the ocular quad longer than wide, nearly trapezoid, narrowing anteriorly, widely spaced from its laterals as compared to anterior medians which are placed closer to its laterals, ocular area completely furnished by fine white and brown plumose setae with few scattered strong hairs around the base of posterior eyes and fringe of fine hairs clothe the anterior medians and laterals. Clypeus slightly elevated, with a row of 4-6 long fine white hairs.

Chelicerae: Well-developed, elongated, brown coloured, nearly parallel lateral sides, with slightly broadened base, narrowing apically and finally ending in strong fang having fine serrations or dentations on the inwardly curved margin, chelicerae show moderately developed cheliceral furrow with fringe of unequal fine hairs on both margins of the furrow, extending till the paturon, the promarginal region having 3 prominent, unequally spaced and sized (first two bigger, third small) teeth placed a bit posterior than those on retromarginal teeth, the middle (2nd) tooth comparatively closer to the 3rd tooth than the 1st. Prominent, strong 3 retromarginal but the spacing between the 1st & 2nd is comparatively less than the spacing between 2nd & 3rd tooth. Dorso-lateral cheliceral surface covered by scattered long, slightly curved hairs of unequal length.

Maxillae (Endites): Elongated, brown coloured, well-developed, comparatively broadened apically and slightly converged and narrowed basally. Maxillae furnished with strong slightly curved spines of dissimilar length, scattered completely on the surface, apical region showing scopular bunch, and serrular region being replaced by sclerotised line, giving apical tip, a rebordered appearance.

Labium: Nearly dome-shaped, having brown base and light coloured apical region. Comparatively longer than wide with a fringe of unequal spines covering the complete apical tip, slight convergence can be seen at the median region. Scattered spines noticed on the apical & median region, while row of very fine dense plumose setae near the basal region extending till the labio-sternal junction.

Sternum: Nearly shield-shaped, pale, devoid of any markings and tubercles. Well decorated with unequal strong spines scattered uniformly on sternal surface. Sternum not fused with the labium, at the labio-sternal junction, dense row of very fine white plumose setae can be seen which is finishing at the slight concave to nearly straight anterior region of the sternum. Sternum doesn't show any modifications of extension of sternal sides within coxae, but poorly developed precoxal sclerites can be seen. Sternum hirsute due to presence of fine white hairs of unequal length, which densely & uniformly covered the sternum.

Female Palp: Well-developed with a dentate claw. Tarsus densely covered with scattered fine spines. The density of these fine spines goes on decreasing as we approach the configured segments. Few strong scattered spines can be seen on the female palp till its entire length.

Table-1: Body measurements of both Female and Male *H. mahendriensis* (in mm).

Body Parts(Female)	Length	Width	Body Parts(Male)	Length	Width
Carapace	4.19	3.43	Carapace	5.08	4.10
Abdomen	7.70	3.77	Abdomen	6.75	2.09
Total body length = 12.39			Total Body Length = 12.33		

Legs:- Long, brownish, slender, without claw tuft, but with moderately developed onychium and three claws (2 claws dentate, while 3rd median claw poorly developed), legs very hairy and clothed with spines of unequal size and distribution, coxae of all the legs placed very close to each other, but a separation is seen in between 2nd & 3rd coxae, giving the legs nearly prograde position, tarsus of the 1st leg is curved, while this segment is normal in other legs, trichobothrial hairs at the tarsal (tarsus & metatarsus) region of all the four legs, arranged in 2 rows with long, curved hairs, while this arrangement goes on changing when we approach the tibia, patella & femur. The trichobothrial hairs on tibia, patella & femora are comparatively small and straight in appearance, the distribution and length of hairs varies according to the segments, while the number of scattered spines is few on tarsus, more on metatarsus and comparatively much more on tibial and femoral segments. Coxae of all legs clothed with very fine stubby hairs, and are placed close to each other (2nd & 3rd separated), trochanter deeply notched with a ring of hairs at proximal region, femur having black or brown dots both on dorsal and ventral sides, tarsi with **extra-tarsal segment** and with dots on dorsal and ventral sides, metatarsus and tarsus segments of leg I being the longest of all other legs.

Leg formula - 1423.

Table:2, Leg Measurements- female *H. mahendriensis* sp.nov.(in millimeter)

Segments	Leg I	Leg II	Leg III	Leg IV	Palp
Coxa	1.35	1.14	1.12	1.32	0.38
Trochanter	0.30	0.31	0.33	0.30	0.49
Femur	7.94	6.38	3.87	7.76	0.95
Patella	1.37	1.33	1.26	1.31	0.89
Tibia	7.91	5.63	2.66	6.98	0.85
Metatarsus	8.49	5.79	2.98	7.95	-
Tarsus	6.79	4.98	1.95	6.52	1.19
Total Length	34.15	25.56	14.17	32.14	4.75

Abdomen (Opisthosoma): Elongated, longer than wide, broader anteriorly, densely clothed with brown and white hairs imparting a cryptic colour to the dorsum, dorsum decorated by foliage of varying width i.e. broadest at the anterior region, finally tapering with the narrowing posterior region, foliage comprised of wavy, fine and unequal lines of both dark brown and white colour, intermingled between one another, while two broad white bands running laterally on both sides till the entire length of abdomen, anteriorly, a broad white band of wavy margins can be seen finishing till the median region of the dorsum, abdomen very densely clothed with brown and white hairs on both dorsal and ventral sides, ventrally, brown coloured, array of dots (4 rows, outward 2 rows longer while inward 2 rows smaller) radiating vertically from the epigastric furrow to the spinnerets present, lateral region being decorated with scattered irregular dots or sometimes small striations on both the sides.

Epigyne: Well-developed, entelegyne, prominent epigastric furrow, epigastric furrow and epigyne covered with long fine white hairs, epigyne having a pale orange coloured median field which is comparatively longer than wide and height almost half of its width, intact position shows a deep concavity in which the median field is embedded, and after removing the median field, sclerotised spermathecae, with lobes appear, spermathecae nearly round dorsally with narrow tubes, appearing like a headset along with the median field, spermathecae converging outward ventrally, having narrow, slightly curved tubes while extra processes or accessory spermathecal attachment can be seen at the distal end of the spermathecae, fertilization duct very fine and narrow.

Spinnerets: Well-developed spinnerets, surrounded with ring of long fine white hairs, anterior pair comparatively stronger, broader and two segmented, median pair embedded within the anterior and posterior spinnerets and is comparatively smaller and 3 segmented, posterior spinnerets appears 3 segmented and comparatively thickly clothed with fine hairs, colulus poorly developed.

General Description of male *H. mahendriensis* sp.nov.

Male: In general similar to female, but carapace comparatively bigger (both in length & width), chelicerae more elongated, greater and comparatively lesser in width, retromargin of chelicerae with 1 small tooth, promargin with 2 unequal teeth; fang elongated and without serrations, maxillae comparatively bigger and with less scattered spines and hairs; scopulae depleted to almost absent; Sternum slightly larger showing comparatively more visible precoxal sclerites; comparatively longer legs; abdomen oval, slightly smaller than in female; palp comparatively longer.

Table:3, Leg Measurements- male *H. mahendriensis* sp.nov.(in millimeter)

Segments	Leg I	Leg II	Leg III	Leg IV	Palp
Coxa	1.41	1.21	1.01	1.22	0.45
Trochanter	0.38	0.32	0.31	0.39	0.61
Femur	7.08	7.00	3.50	7.43	1.22
Patella	2.26	2.05	1.09	1.87	0.66
Tibia	8.97	6.89	2.74	6.66	0.80
Metatarsus	9.86	7.18	3.22	7.09	-
Tarsus	8.69	6.40	4.04	6.64	1.53
Total Length	38.65	31.05	15.91	31.30	5.27

Male Palp: Palp without any femoral modification, retrolateral tibial apophysis present at the base of the cymbium, cymbium broader at the base and middle having interior concavity and finally tapering apically, long white hairs present at the base of the cymbium, genital bulb nearly round and pearly white in appearance, recepticulum seminis coiled, terminally ending in an elongated embolus, laterally, median apophysis is a finger like projection coming out of the palp and is almost parallel to the palpal axis, embolus elongated, outstretching the conductor, conductor flap-shaped, tapering and twisting terminally, enlarged at base, conductor's apical portion (tip) is over middle of embolus, without touching it.

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